

REMARKS

Claims 1, 2, 4-9, 11-14 and 21-24 are pending.

Claim 1 is amended to correct an inadvertent typographical error. No new matter has been entered.

I. 35 USC 112, first paragraph

Claims 21-24 are rejected under 35 USC 112, first paragraph as failing to comply with the enablement requirement.

Claim 21 is amended to more closely correspond to the disclosure at page 10 of the present application also referred to in the Office action.

II. 35 USC § 103(a)

Claims 1, 2, 4-9, and 11-14 stand rejected under 35 USC § 103(a) as allegedly being unpatentable over CA 910844. The Office Action asserts the reference teaches or suggests each feature of the claims.

Page 7 of CA '844 says, "the V-groove 18 at the bottom edge of the cathodes blank 10 causes the copper to deposit at this edge in the form of dendrites which develop in directions normal to the sides of the V-groove. The plate at which these dendrites meet in their growth is a plane of weakness at which their deposit can readily be broken." The Office action asserts this is also what the present invention is doing and considers determining some notch angles work better than others is part of obvious trial and error testing. The Office action at page 4 is also still asserting "figure no. 3 of the CA patent shows the v-groove used in the bottom of the plate and it appears to be in the range as set forth in applicant's instant claims."

The Office action at page 4 asserts the resulting fracture line is not essentially on one side of the cathode mother plate because of the above-described teaching from CA '844 about the plane of weakness where the dendrites meet.

A. It is respectfully submitted the Office action is making a hindsight analysis

Applicants respectfully submit the present selection of the range of between 75 and 105°, permits (1) separation of the deposited metal into two substantially equivalent sheets, by (2) having a fracture line inside the V-groove, (3) without the need for repeated rotating and

flapping, as described in the present specification at page 5, lines 9-14 and page 6, lines 5-12, none of which features are taught or suggested by the reference. It is the selection of the presently recited range that overcomes the deficiencies of the prior art. As described at page 9, lines 11-14, certain groove expressing the formula  $90^{\circ} \pm 15^{\circ}$  sizes permit such symmetrical splitting of the deposited metal while others do not.

As explained in the Request for Reconsideration filed August 3, 2006, measuring the angle shown in FIG. 3 of CA '844 indicates it is  $50^{\circ}$ .

Applicants respectfully submit the invention of CA '844 is substantially similar to the embodiment shown as Figure 3 in the present specification (identified as PRIOR ART), and described at page 4, lines 12-23. Plates were available with V-grooves prior to the present application. However, the problems associated with these prior art V-grooves are discussed in the specification, namely, they do not cleave correctly within the V-groove. It is respectfully submitted it is not obvious that the solution to the problem involves the angle of the V-groove. It could have involved the size of the V-groove, the shape of the groove or any of the other process parameters involved in metal deposition and stripping.

The Applicant determined it was not the stripping machinery etc. which caused the problem or the deposition parameters. Rather the cause of the poor release/uneven release of the prior art was the quantity and structure of the copper deposited within the V-groove. It was far from clear, however, whether the solution was more copper to be deposited within the groove or less copper being deposited within the groove, or in fact as in this case a fine balance of the two competing interests, i.e. enough copper is in the V-groove relative to the thinner outside deposit (reduce preferential tearing or stripping outside) but not so much as to increase the bond to a level higher than exterior metal.

The prior art has various other techniques for modifying the quantity of metal deposited within the V-groove. In some instances a ceramic coating is provided in the V-groove to prevent copper being deposited within the groove. In the CA '844, the angle of the V-groove is  $50^{\circ}$ . This is nowhere near the angle of  $90^{\circ}$  plus or minus  $15^{\circ}$  of the present claims. Indeed there is no recognition of the problem associated with the prior art.

The Applicant determined there is a range for the angle of the V-groove which provides the correct quantity of deposited material within the groove such that there is a

reliable separation of the substantially equivalent sheets along the line of weakness formed within the groove.

The dendrites grow in a direction normal to the sides of the V-groove such that they will also meet it approximately  $90^\circ$  plus or minus  $15^\circ$ . However, the angle formed by the V-groove sides determines the angle at which the dendrites meet. Thus, the dendrites of CA '844 will meet at  $130^\circ$  ( $180^\circ$  minus  $50^\circ$ ). Once the problem associated with the prior art has been determined (by no means obvious) it is still not obvious to alter the angle of the V-groove since equally the shape or size of the V-groove, coating of the V-groove etc. could be the solution to the problem.

B. Rule 132 Declaration

The concurrently filed Declaration by one of the inventors discusses the criticality of the angle ray of the V-groove. For example, as explained in paragraph 8 of the Declaration, the  $90^\circ \pm 15^\circ$  was determined on the basis for "the need for the span of the V-groove to be large enough for copper to be deposited in the groove and thereby produce fracture or crack initiation within the group (as opposed to on the outside of the group) but not so large that it completely fills with deposited materials to such an extent that the material cannot be released cleanly."

As explained in paragraph 9 of the Declaration, "the approximate  $50^\circ$  span of the prior art in CA 910,844, as shown in Fig.3 thereof, does not provide for clean release the deposited metal from the cathode."

Thus, CA '844 does not teach or suggest limiting the angle of the V-groove as presently claimed.

C. Dependent Claims Further Distinguish Over CA '844

Claims 2 and 9 recite the line of weakness is formed within the arc of the V. There is no teaching or suggestion of such a feature in the reference. Since, as shown by Figure 3, the angle of the V determines the location of the line of weakness, it cannot be said that such a feature is inherent, i.e., necessarily present, in the cited reference. Thus, Applicants respectfully submit claims 2 and 9 are allowable over CA '844.

Claims 5 and 12 recite "wherein the groove is shaped to allow deposition of metal directly adjacent the apex of the groove." While the reference teaches that the deposition occurs

“in directions normal to the sides of the V-groove” (page 7, lines 14-15), it is not necessarily so, i.e., inherent, that the deposition occurs “directly adjacent to the apex of the groove.” As shown by Figure 3 of the present specification, depending upon the angle of the V-groove, such a feature may be impossible. Accordingly, Applicants respectfully submit claims 5 and 12 are allowable over the cited references.

Claims 7 and 14 recite “wherein the groove is shaped to capture gas rising from below the cathode plate during deposition of metal.” Again, there is no teaching or suggestion of such a feature in the reference. Since, as shown by Figures 3-6, the angle of the V determines the location of the line of weakness, it cannot be said that such a feature is inherent, i.e., necessarily present, in the cited reference. Thus, Applicants respectfully submit claims 7 and 14 are allowable over CA '844.

D. Claims 21-24 Further Distinguish Over CA '844

Claim 21 and its dependent claims further distinguish the present invention from the invention of CA '844. Specifically, Claim 21 recites, *inter alia*, a step of trapping gas in V-groove to define the location of the frangible portion. By directing the location of the trapped gas, the location of the frangible portion where the deposited metal will fracture can be more accurately controlled. This permits more reliability in the symmetrical nature of the resulting sheets. As CA '855 neither teaches nor suggests such a step, Applicants respectfully present Claim 21 is allowable over the cited references.

III. Conclusion

In view of the above, it is respectfully submitted the present claims are neither taught nor suggested by the cited references and the present invention is novel and inventive over the cited document. A Notice of Allowance is respectfully requested.

If any fee is necessary to make this paper, or any paper filed herewith, timely and/or complete, such fee may be deducted from deposit account number 19-4375.

Respectfully submitted,

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